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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,762	06/25/2001	Yonina C. Eldar	0492611-0395(MIT 9170)	9398
7590 03/23/2009 CHOATE, HALL & STEWART LLP Two International Place Boston, MA 02110			EXAMINER BURD, KEVIN MICHAEL	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 03/23/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/888,762

Applicant(s)

ELDAR ET AL.

Examiner

Kevin M. Burd

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 9-12, 14, 16, 17, 20, 23, 26-28, 33, 35, 37, 40, 42, 43, 46 and 49-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9-12, 14, 16, 17, 20, 23, 26-28, 33, 35, 37, 40, 42, 43, 46 and 49-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsman's Final Drawing Review (PTO-84C)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. This office action, in response to the after final amendment filed 3/9/2009, is a non-final office action.

Response to Arguments

2. Applicant's arguments filed 3/9/2009 for claims 1-5, 9-12, 26-28, 33, 35 and 37 have been fully considered and are persuasive. The previous rejections of the claims are withdrawn. A new rejection of these claims is stated below.
3. Applicant has amendment claims 14, 16-17, 20, 23, 37, 40, 42, 43 and 46 to overcome the previous rejections of the claims stated in the previous final office action. The previous rejection is withdrawn due to these newly added limitations.
4. The previous double patenting rejection is maintained.
5. Rejections of the newly added claims are stated below.
6. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

The substitute specification has been received.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 49-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. The variables recited in the claims are not defined in the claims. Correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-5, 9-11, 26-28 and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Gamal et al (US 6,671,338).

Regarding claim 1-5 and 9-11, Gamal discloses a receiver shown in figure 7. A bank of correlators (matched filter bank 132) receives a signal. The received signal is a CDMA signal. The signal comprises a plurality of user signals each of which is spread using a spreading signal (signature signal). The received signal will undergo some distortion during transmission. The output (vector output) of the bank of correlators will be input to a correlation shaper (MMSE transversal filter 144). The MMSE filter will cancel the interference of the output of the correlators transforming the input signal to a signal free of interference. This interference cancelled signal will be output from the MMSE filter. The output of the MMSE filter will have substantially minimized the mean squared error relationship between the output of the MMSE filter and the input of the

MMSE filter. The output of the MMSE filter will be substantially uncorrelated since the received signals have been decorrelated in the bank of correlators.

Regarding claim 26, Gamal discloses an additional embodiment shown in figure 6. Figure 6 discloses a bank of detectors that will further process the uncorrelated signals (blocks 138, 140 and 142).

Regarding claims 27, 28 and 33, Gamal discloses a method for processing signals in a receiver shown in figure 7. A bank of correlators (matched filter bank 132) receives a signal. The received signal is a CDMA signal. The signal comprises a plurality of user signals each of which is spread using a spreading signal (signature signal). The received signal will undergo some distortion during transmission. The output (vector output) of the bank of correlators will be input to a correlation shaper (MMSE transversal filter 144). The MMSE filter will cancel the interference of the output of the correlators transforming the input signal to a signal free of interference. This interference cancelled signal will be output from the MMSE filter. The output of the MMSE filter will have substantially minimized the mean squared error relationship between the output of the MMSE filter and the input of the MMSE filter. The output of the MMSE filter will be substantially uncorrelated since the received signals have been decorrelated in the bank of correlators.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 12 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamal et al (US 6,671,338) in view of Farsakh (US 6,317,612).

Regarding claims 12 and 35, Gamal discloses the receiver and method stated above in paragraph 8. Gamal does not disclose shaping the correlation by performing a transformation on the output so that the covariance matrix has the property that the second row is a permutation of the first row. Farsakh discloses a method for estimating spatial parameters of transmission channels by estimating a spatial covariance matrix. The correlating step is carried out for each sampling time for each subscriber station thereby generating a predetermined number of special covariance matrices for each subscriber station and the correlating step further comprises averaging the covariance matrices generated for each subscriber station to provide an improved estimated value of the spatial covariance matrix specific to each subscriber station (column 5, line 65 to column 6, line 5). The rows of the matrices are dependent on the other rows of the matrices. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the receiver of Gamal with the teachings of Farsakh to increase capacity in mobile communication systems (column 1, lines 43-48).

10. Claims 49-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gamal et al (US 6,671,338) in view of Davis et al (US 6,771,723).

Regarding claims 49-55, Gamal discloses the receiver stated above in paragraph 8. Gamal does not disclose the transforming matrix is given by the inner product of the received signals. Davis discloses a receiver where the matched filter operation is the inner product of whitened vectors (column 16, lines 23-28). This allows the received signal to be effectively correlated to the stored signals. Gaussian and non-Gaussian interference can be compensated for using this approach (column 16, lines 28-38). For this reason, it would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Davis into the receiver of Gamal.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 14, 16, 17, 20, 23, 37, 40, 42, 43 and 46 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 13, 16, 15, 17, 19, 31, 33, 16, 35 and 37 respectively of copending Application No. 09/788,890. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed set of signature signals are the predetermined set of signals. The claims are not identical since the predetermined set of signals is a broader term than the signature set of signals. However, to correlate the signals, a known set of signals is necessary.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Honig et al (US 5,343,496) discloses a receiver shown in figure 11. The receiver comprises a bank of matched filters for decorrelating spread signals in a CDMA system. The signals are decorrelated and the mean square error between the transmitted symbol and the detected symbol is then minimized (abstract and column 14, line 59 to column 15, line 15). Laasko et al (US 6,011,812) discloses the receiver shown in figure 4 and figure 5. A CDMA signal is received and input to a bank of matched filters 41. The matched filters output the output vector to block 42, which comprises an inverse matrix of the cross-correlation matrix of the spreading codes used (column 6, lines 9-19). A plurality of detectors received the output from block 42.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M. Burd whose telephone number is (571) 272-3008. The examiner can normally be reached on Monday - Friday 9 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on (571) 272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M. Burd/
Primary Examiner, Art Unit 2611
3/19/2009